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MINERALS PROGRAM
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January 9, 1992

Mr. Elliott W. Lips
JBR Consultants Group
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RECEIVED

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DIVISION OF
OIL GAS & MINING

RE: Review of Ground Water Discharge
Permit Application for Topaz Beryllium

Dear Mr. Lips:

We have reviewed an application for a ground water discharge permit dated November 4, 1991 for a new beryllium mill to be located north of Delta, Utah. According to information contained in the permit application, the mill will have four facilities with a potential to cause a release to ground water: the leach pads, process ponds, wastewater lagoon and spent ore stockpile. These facilities must also have a construction permit from this office before construction may begin.

Some of the information needed for the construction permit is contained in the ground water permit application, but other issues need to be resolved before a construction permit is granted. Following are our comments on these planned facilities and other aspects of this project:

General: New facilities must be designed using best available technology (BAT) to prevent exceedance of ground water protection levels. A compliance monitoring plan must be developed which will provide timely detection of a release to ground water. This plan must be designed specifically for the type of facility being built and the hydrogeology of the site. Some of the facilities proposed by Topaz Beryllium do not appear to represent use of BAT, so the compliance monitoring plan cannot be developed until the design of the facility is agreed upon. Based on information presented in the ground water permit application, it appears that ground water monitoring would be feasible at this site and may be used as part of the compliance monitoring plan. Also based on information in the application, we agree that the silty sand unit 35 to 60 feet under the site should be monitored, as it forms the most likely path for contaminant migration. The proposed network of three downgradient monitoring wells does not seem adequate for this purpose at a site of this size. A release could occur and escape detection or not be detected until a substantial volume of ground water had been contaminated.

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The compliance monitoring plan and ground water monitoring well network should be capable of detecting changes in the ground water flow system as the ground water mound currently under the site decays. It may be necessary to modify the plan in the future to accommodate these changes.

Data presented in the application suggests that the water table aquifer under the site is Class III, however, final determination of ground water class will be made after four consecutive quarters of accelerated background water quality monitoring.

The well proposed for upgradient monitoring, TBV-1, may be acceptable under the estimated current hydrogeologic conditions, but the potentiometric surface under the site must be better defined before we can make this determination. As the ground water mound under the site decays, the hydraulic gradients will eventually return to the regional trend sloping from east to west, rather than the present slope from northeast to southwest. Ground water from this regional flow system may be of different quality than water from the mound, and under the new flow system, an additional upgradient monitoring point may be needed for the southern part of the site. Inspiration Gold should install at least two piezometers in the southeastern part of the site to define the potentiometric surface in that area and monitor changes over time. It may be desirable to install wells which could be used for sampling, if this is necessary at some later time.

Leach Pads and Process Ponds: The asphalt pavement and petrotexile sandwich shown as the primary liner for the leach pads are not considered BAT, as required by the ground water regulations. Nationally, asphalt pavement liners have failed functionally as primary liners for on-and-off leach pads. Perhaps this may be due to the nature of materials for construction. A protected geomembrane as the primary liner and a 1×10^{-7} cm/sec clay as the secondary liner to form a composite liner for on-and-off leach pad are considered BAT. There is no question that a geomembrane would need protection in an on-and-off leach pad. A thick cover cushion, or a cushion with a asphalt pavement cover structure could be useful as protection for the geomembrane.

A single geomembrane for the process ponds is not considered BAT, due to its low leakage detection sensitivity. Dual geomembrane lined process ponds with a cushioned leak detection medium between the FMLs, so any leaks will drain to a sump, that can be gravity drained, are considered BAT for ponds.

Any asphalt and aggregate materials underlying the leach pads should not be degraded by contact with the process solutions. If ground water monitoring is needed for compliance monitoring of these facilities, Inspiration Gold should supply information on the expected chemistry of the process solutions, including major ions, pH and metals content, so monitoring parameters may be assigned.

Wastewater Lagoon: Inspiration Gold has not submitted information on the expected chemistry of the wastewater to be impounded in the lagoon, which would demonstrate that the wastewater would be compatible with the receiving ground water. Water discharged through the earthen liner of this pond must not cause exceedance of the appropriate ground water protection levels. If the wastewater contains contaminants or concentrations of dissolved solids which may cause an exceedance of the protection levels, the lagoon may need to be lined with a synthetic flexible membrane liner compatible with the wastewater chemistry. Investigation of recycling or other waste minimization technology may show the lagoon size could be decreased.

In this case, compliance monitoring could be accomplished by ground water monitor wells, but numbers and placement of monitor wells can only be determined after wastewater chemistry is known and an acceptable design for the lagoon is agreed upon. The proposed monitor well network appears inadequate to provide timely leak detection for a lagoon of the proposed size.

Spent Ore Landfill: In order to dispose of spent ore in the manner proposed in the application, the spent ore should be neutralized and the rinsate should meet the ground water protection levels prior to placement in the landfill. Given the arid climate in the region and the assertion that the spent ore will not be free-draining, bottom liners may not be necessary for this landfill. However, the Division of Oil, Gas, and Mining should also consider this issue. An estimate should be made of the chemistry of the leachate generated by infiltration into the spent ore. With this information a final cover should be designed which will minimize infiltration of precipitation into the landfill to the degree necessary to prevent exceedance of ground water protection levels. If necessary, computer modeling using estimates of the amount and chemistry of leachate produced with the proposed design should be used to provide a theoretical demonstration that ground water protection levels will not be exceeded. Investigation of neutralizing the spent ore may show a way to minimize generation of poor-quality leachate, and perhaps reduce the need to control infiltrating precipitation.

Monitor wells may be used for compliance monitoring on the west perimeter of the landfill. Spacing between wells should be determined taking into account migration pathways and dispersion of leachate likely to be produced by the landfill. Although not required, if the final design of the facilities is similar to that proposed in the application, it may be desirable to install a monitor well on the south perimeter of the landfill, which will be adjacent to the wastewater lagoon. This may help to determine whether an exceedance at a well downgradient of the lagoon is due to a discharge from the lagoon or the landfill.

In summary, the design of facilities for this site should incorporate BAT to insure no discharge takes place, or a demonstration should be made that any proposed discharge is compatible with the receiving ground water. A compliance monitoring plan should be developed to demonstrate to the executive secretary's satisfaction that ground water protection levels are not exceeded.

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Contingency plans must be developed for all facilities. These are to be followed in the event that ground water contamination in excess of the protection levels is revealed by compliance monitoring.

To facilitate resubmittal of the revised application to address the above deficiencies, we are interested in meeting with you and the Division of Oil, Gas, and Mining (DOGM) regarding this proposal. Please call Mark Novak of this office to schedule a meeting time.

Sincerely,



Don A. Ostler, P.E.
Director

DAO:MN:rp

cc: Robert A. Prescott, Inspiration Gold, Inc.
Roger Foisy, District Engineer
Wayne Hedberg, DOGM
Central Utah District Health Dept.

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